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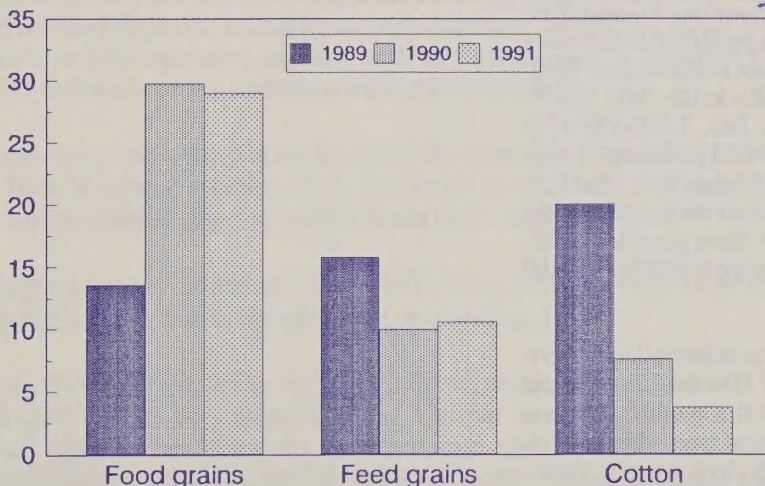
AFO-39  
December 1990

# Agricultural Income and Finance

## Situation and Outlook Report

### Government Payments Bolster Low Wheat Prices

Payments as percent of receipts + payments



1990-91 forecast.

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**Agricultural Income and Finance Situation and Outlook.** Agriculture and Rural Economy Division, Economic Research Service, U.S. Department of Agriculture, December 1990, AFO-39.

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## Summary

The U.S. farm economy enters 1991 with cause for cautious optimism, as expected record-level commodity receipts suggest a relatively strong demand for farm products. Livestock producers should benefit from anticipated differentials between livestock and feed prices. Crop supplies and prices, however, will be sensitive to weather and economic developments around the world. As 1990 wheat markets have shown, commodity stock levels can change dramatically with one production season.

Despite high cash receipts of \$170 to \$175 billion, an expected rise in farm expenses will mean less net income available to farmers. Net cash income, forecast at \$55 to \$60 billion, will most

likely be down slightly from 1990's \$59 billion. Net farm income will probably also fall, ranging from \$44 to \$49 billion. However, the net income squeeze is anticipated to be much less severe than that of the mid-1980's, and the combined effects of higher asset values and steady debt levels reduce farmers' vulnerability to short-term fluctuations in income.

Overall, the financial position of farmers entering 1991 appears to be stronger than at any time since the late 1970's. This is largely due to cautious investment behavior, effective cost control, increased cash financing, and continued reduction of outstanding debt. Equity in the sector is expected to rise to between \$695 and \$705 billion.

While the health of the farm economy through the next few years is not a certainty, farmers and their lenders appear to be incorporating some hard finance lessons from the mid-1980's. Both are now reluctant to respond to the relatively high income levels of recent years with renewed debt-financed expansion. Farmers are applying this same cost consciousness to variable input usage. Higher prices for most purchased inputs, at least in the near term, will require application of even more effective cost control measures. With the globalization of agriculture, politically resolved trade issues may significantly change economic relationships, creating conditions that are expected to have a strong impact on the sector's financial performance.

### GLOSSARY OF TERMS IN FARM INCOME AND FINANCE

**Net cash income**—is the sum of cash receipts, farm-related income, and direct Government payments, minus cash expenses. This cash-based concept measures the total income farmers receive in a given year, regardless of the year in which the marketed output was produced. It indicates the availability of funds to cover cash operating costs, finance capital investments and savings, service debts, maintain living standards, and pay taxes.

**Net farm income**—is the difference between gross farm income and total expenses. This accrual-based concept measures the profit or loss associated with a given year's production. Additions to inventories are treated as income. Nonmoney items such as depreciation, the consumption of farm-grown food, and the net imputed rental value of operator dwellings are included in the calculation.

**Net cash flow**—is the sum of: gross cash income, the change in loans outstanding, net rent to nonoperator landlords, and the net change in farmers' currency and demand deposits; minus gross cash expenses and gross capital expenditures. This financial indicator measures cash available to farm operators and landlords in a given year. It indicates the ability to meet current obligations and provide for family living expenses, and to undertake investments.

**Debt/asset ratio**—measures both proportional owner equity in the farm and the financial risk exposure of the operation (the extent to which the farm's assets have been borrowed against). It is calculated as total debt outstanding as of January 1, divided by the farmer's estimate of the current market value of owned assets of the farm business.

**Equity level**—measures net worth. It is the hypothetical balance that would remain from the sale of assets and paying off existing debt. It is calculated as total operator assets minus operator debt outstanding.

**Current and inflation-adjusted dollars**—In this report, dollar values of income, expense, asset, and debt items, unadjusted for the effects of inflation, are referred to as current or nominal dollars. Current or nominal figures, which indicate the purchasing power prevailing in the cited year, do not allow for fully accurate comparisons across time. To allow for meaningful comparisons across time, adjustments for the effects of inflation are made. Adjusted figures use a 1982 base and are interchangeably referred to as real, constant dollar, or inflation-adjusted.

## 1991 Incomes Squeezed by Rising Expenses

*The 1991 outlook is for limited growth in an otherwise healthy farm economy.*

The \$1- to \$6-billion increase in gross cash income in 1991 will be accompanied by a \$2- to \$8-billion rise in cash expenses. The projected higher expenses will cause 1991 net cash income to drop to between \$55 and \$60 billion, slightly below the record \$59 billion expected in 1990.

Net farm income, which accounts for non-cash as well as cash income and expense items, is also likely to be lower next year. Projected at \$44 to \$49 billion, it could be down as much as 10 percent from the \$49 billion expected in 1990.

### **Cash Receipts Surpass \$170 Billion**

The record levels of crop and livestock sales anticipated in 1991 will increase cash receipts from 1 to 4 percent over 1990, boosting total sales to between \$170 and \$175 billion. Strong annual sales growth has been a driving force in the farm sector recovery since 1987. During this period, livestock receipts have maintained a relatively stable 52 to 54 percent of total sales; this relationship is projected to continue in 1991.

### **Cattle and Hogs: Stable Receipts Through 1991**

Livestock receipts are expected to match 1990's record level of \$91 billion. Cattle prices are forecast to remain strong, averaging in the mid-\$70's. With production increasing slightly--less than 2 percent--cash receipts for cattle and calves are likely to be up about 3 percent in 1991. Hog receipts are anticipated to hold firm in 1991, a 3- to 4-percent price decline offset by more marketings.

Broiler and turkey prices are projected to average about the same as this year, with production gaining 5 to 6 percent. Dairy receipts are expected to drop 10

percent as production growth puts downward pressure on milk prices.

### **Record Crop Sales**

Crop receipts may exceed \$80 billion in 1991, gaining \$1 to \$5 billion over 1990. Pushed by low stocks and pulled by steady livestock demand, feed grain sales could increase as much as \$3 billion. Corn receipts are likely to be up 10 percent, while soybean receipts are expected to rise above \$11 billion. Growth in fruit and vegetable marketings at stable prices will mean higher cash receipts.

Wheat appeared to be one of the strongest crop commodities as 1990 began. Low stockpiles led to low ARP's and encouraged an increase in acres of wheat planted. Harvested acres increased by 12 percent in 1990, and yields rose by over 20 percent, resulting in a 35-percent increase in U.S. production. Wheat prices fell throughout 1990 as bumper crops here and abroad were brought to harvest. Receipts in 1990 are expected to drop 5 to 10 percent, as the price decline has more than offset the rise in production. Sales of wheat in 1991 are forecast down as much as \$2 billion, with planted acreage declining and stocks holding the market price below the 1990 average.

### **Direct Government Payments Drop**

The Food, Agriculture, Conservation, and Trade Act (FACT) of 1990, in conforming to provisions of the Omnibus Budget Reconciliation Act, is expected to lower direct payments beginning with 1991/92 crops. Some of the payments received in calendar-year 1991 result from the 1990 programs. However, the policy changes are anticipated to reduce direct payments by \$700 to \$900 million in 1991.

Direct Government payments to farmers are forecast to fall by 10 to 15 percent in 1991, continuing the trend of lower Government outlays to the farm sector. Total direct payments to farmers plus net CCC loan values accounted for 10 percent of gross cash income in 1987. That proportion has dropped annually in the intervening recovery years. In 1990 and 1991, Government outlays are expected to be less than 5 percent of gross cash income.

### **Manufactured Inputs Lead Farm Expense Rise**

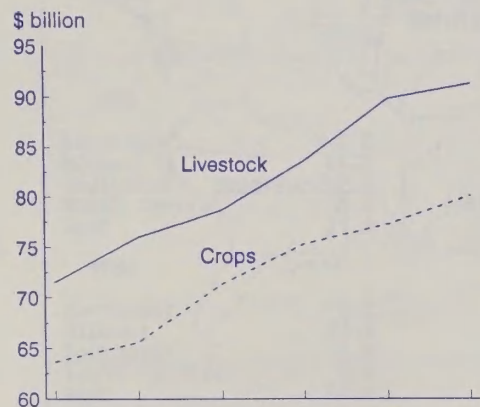
The most pronounced farm cost increases are attributed to the August oil price shock, which raised the 1990 fuel price index 10 to 15 percent over 1989. Despite early forecasts of lower oil prices by the end of 1991, the fuel price index is anticipated to rise another 8 to 12 percent for the year. Prices of most production items are expected to drift upward, with the exception of feed and feeder livestock.

Total expenses are forecast to rise \$4 to \$9 billion in 1991. This 3- to 6-percent annual increase follows a 2-percent gain in 1990. Feed and feeder livestock expenditures are expected to increase less than 2 percent. Expenditures for oil-related manufactured inputs show the greatest projected increase, adding \$1 to \$3 billion to total expenses. Farmer expenditures for manufactured inputs are likely to increase by 9 to 10 percent in 1991.

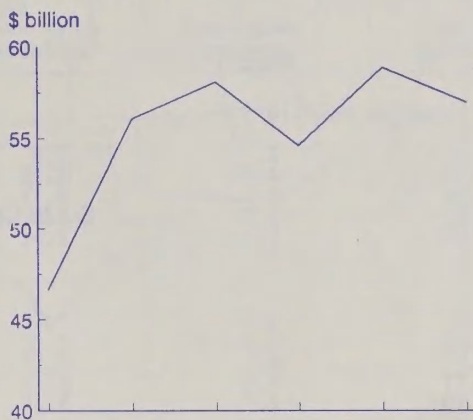
Interest expense is expected to remain between \$14 and \$15 billion, as debt levels stabilize and interest rates flatten. During the high debt and interest rate periods of the early 1980's, interest expenses were almost 16 percent of all production expenses. For 1991, the proportion is forecast to be less than 10 percent.

Both crop and livestock receipts will continue to rise in 1991. However, with decreasing Government payments and increasing cash expenses, nominal net incomes will probably fall. Real net incomes will also drop. Farm asset values will continue rising, but slow to some 2 percent. Farm debt, after falling for 7 straight years, will increase slightly in 1991, slowing equity growth to 2 percent.

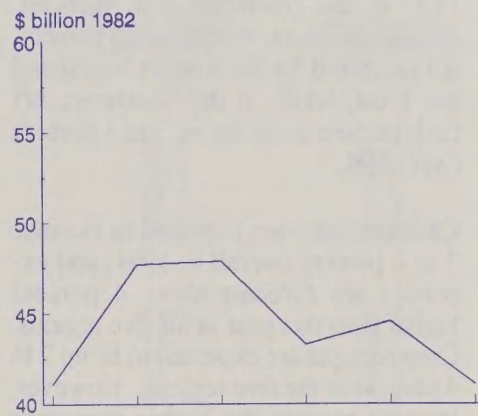
**Cash Receipts**



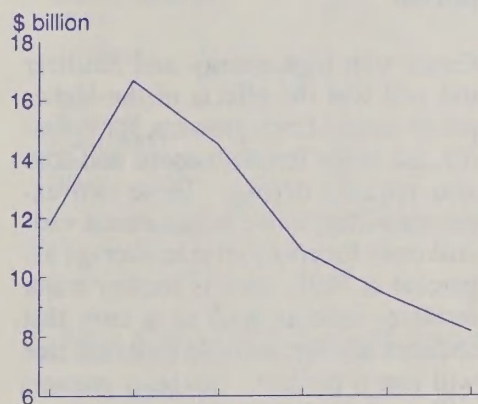
**Net Cash Income**



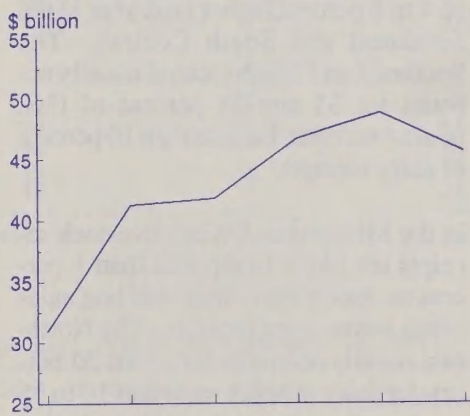
**Real Net Cash Income**



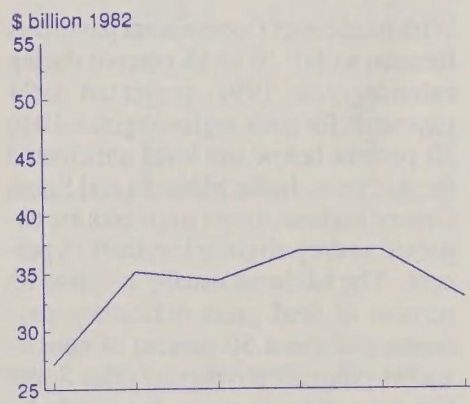
**Government Payments**



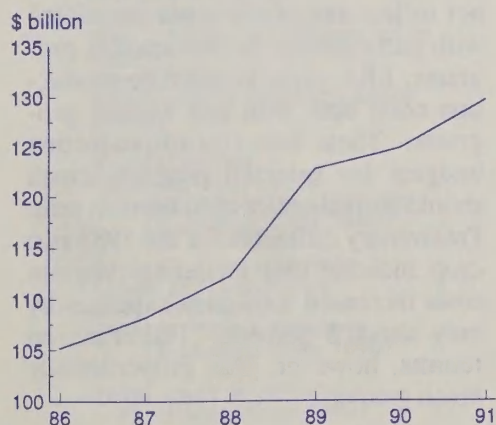
**Net Farm Income**



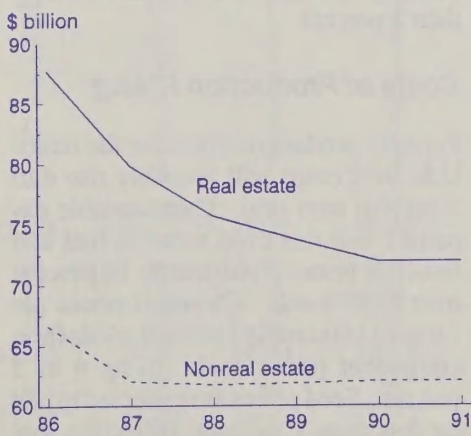
**Real Net Farm Income**



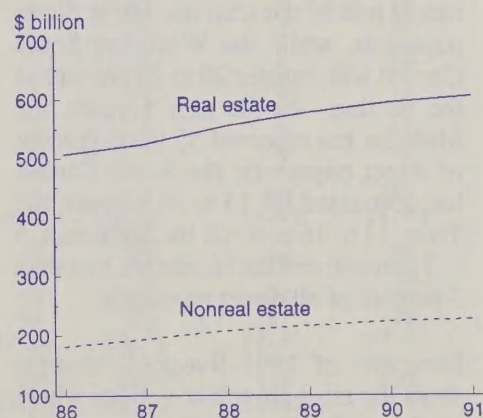
**Cash Expenses**



**Farm Debt**



**Farm Assets**



1990-91 forecast.

# Expenses Pinch Net Incomes in All Regions

*Net cash incomes will fall slightly across the country as production costs rise.*

In all but one of the five farming regions, expenses are expected to increase more than gross income during 1991. Early forecasts for 1991 indicate net cash incomes down 5 to 10 percent from 1990 in the Northeast and Midwest. Smaller declines, of less than 5 percent, are projected for the South Central and the West, while in the Southeast, net cash income could be up 3 to 4 percent over 1990.

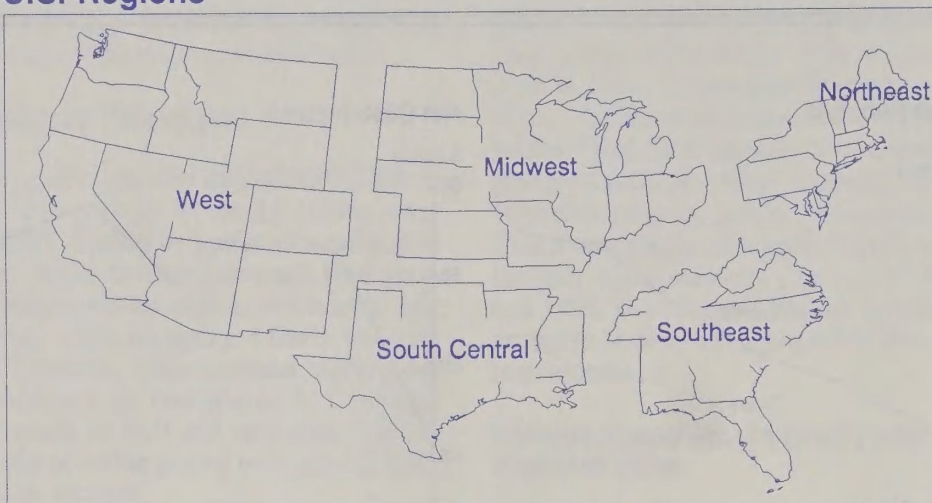
Cash expenses are expected to increase 3 to 6 percent overall in 1991, and expenses are forecast about 4 percent higher than this year in all five regions. Crop receipts are expected to be up 2 to 4 percent in the five regions. However, in most regions the higher crop cash receipts are not enough to offset combinations of reduced direct payments and weak dairy receipts.

With total direct Government payments forecast to fall 10 to 15 percent during calendar-year 1991, projected 1991 payments for each region register 10 to 20 percent below the level anticipated for this year. In the Midwest and South Central regions, direct payments are expected to drop slightly less than 15 percent. The Midwest usually receives 85 percent of feed grain deficiency payments and about 50 percent of conservation program payments. The South Central region accounts for nearly 80 percent of rice deficiency payments.

The Midwest will probably account for nearly half of the total decline in direct payments, while the West and South Central will register 20 to 25 percent of the decline. In the past 5 years, the Midwest has received 55 to 65 percent of direct payments; the South Central has accounted for 15 to 24 percent; the West, 11 to 16 percent; the Southeast, 5 to 7 percent; and the Northeast, less than 3 percent of all direct payments.

Forecasts of 1991 livestock receipts show the most growth in regions where poultry is dominant, and contraction in

## U.S. Regions



regions with significant dairy production. Livestock receipts are projected to be 4 to 6 percent higher next year in the Southeast and South Central. The Southeast and South Central usually account for 35 and 25 percent of U.S. poultry receipts, but less than 10 percent of dairy receipts.

In the Midwest and West, livestock receipts are likely to dip less than 1 percent as strong beef cattle and hog sales offset lower dairy receipts. The Northeast usually accounts for about 20 percent of dairy product sales and 10 to 15 percent of poultry cash receipts. In that region, lower dairy receipts will offset the projected gains in poultry sales, pushing livestock receipts down more than 2 percent.

## Costs of Production Rising

Per-acre production costs for the major U.S. field crops will probably rise 4 to 5 percent next year. Cash variable expenses will rise even more as fuel and fertilizer prices climb nearly 10 percent over 1990 levels. Chemical prices are forecast to increase 3 percent while farm equipment prices could go up 4 to 5 percent. Seed prices are expected to rise by less than 1 percent, reflecting low

1990 grain prices. Fixed cash costs are rising moderately, averaging around 3 percent.

Crops with high energy and fertilizer use will feel the effects of the higher prices most. Corn growers, for example, are major fertilizer users, and corn also requires drying. These two expenses will combine to cause total variable costs for corn to rise an average 5.9 percent in 1991. Rice is another major fertilizer user as well as a crop that requires drying; variable costs for rice will rise 6 percent. Soybean growers will see the least cost increase, averaging only 4.4 percent for 1991.

Although the costs presented here do not reflect any of the costs associated with participating in Government programs, ERS plans to estimate production costs both with and without programs. These new cost-of-production budgets for selected program crops should be available within the next year. Preliminary estimates for the 1988 rice crop indicate that including program costs increased total cash expenses by only about 3 percent. The effect on returns, however, was proportionally much greater.

*The Southeast will be the only one of the five major production regions likely to see an increase in net cash income in 1991. The increase is due mainly to the healthy performance of the poultry sector. With increasing fuel expenses, the costs of producing corn and rice will probably rise most among the major field crops.*

Table 1--Southeast is only major region posting a net income gain in 1991

	Cash receipts		Government payments	Cash expenses	Gross cash income	Net cash income
	Crops	Livestock				
Billion dollars						
1988						
Northeast	3.8	6.5	.2	6.8	10.8	4.0
Midwest	25.7	33.8	9.4	47.6	71.0	23.4
Southeast	12.0	11.6	.9	16.1	25.6	9.6
South Central	8.8	12.8	2.2	16.6	24.9	8.3
West	21.1	14.1	1.7	24.9	38.1	13.2
1989						
Northeast	4.0	7.1	.2	7.5	11.5	4.0
Midwest	27.4	35.1	6.0	52.7	71.4	18.7
Southeast	12.9	12.8	.8	17.7	27.7	10.0
South Central	8.6	13.8	2.5	17.9	26.4	8.5
West	22.6	14.8	1.4	27.0	40.4	13.4
1990F						
Northeast	4.0	7.9	.2	8.0	12.5	4.5
Midwest	29.5	39.4	5.2	54.5	76.0	21.5
Southeast	13.1	13.5	.6	17.3	28.9	11.6
South Central	9.1	14.2	1.8	17.8	26.1	8.3
West	21.7	15.7	1.7	27.3	40.3	13.0
1991F						
Northeast	4	8	*	8	12	4
Midwest	31	39	5	57	77	20
Southeast	14	14	*	18	30	12
South Central	9	15	2	18	27	8
West	23	16	1	28	41	13

F = forecast. \* = less than \$500 million.

Table 2--U.S. cash costs of production will rise 4 to 5 percent in 1991

	Corn	Sorghum	Barley	Oats	Wheat	Rice	Soybeans	Cotton
Dollars per planted acre								
Cash expenses: 1/								
Seed	18	4	9	10	8	22	15	8
Fertilizer	49	18	17	15	17	43	7	31
Lime and gypsum	2	0	*	2	1	0	*	*
Chemicals	23	11	7	1	4	46	14	53
Custom operations	6	4	3	5	4	42	5	13
Fuel, lube, and electricity	15	14	10	8	10	59	12	37
Repairs	9	9	9	7	8	29	8	24
Hired labor	9	3	7	7	3	44	3	47
Purchased irrigation water	*	*	3	0	*	10	0	11
Drying	11	1	0	0	0	51	0	0
Ginning	0	0	0	0	0	0	0	61
Miscellaneous	0	0	0	0	0	1	0	0
Technical services	*	*	*	*	*	1	*	2
Total variable expenses	143	64	64	53	56	347	64	287
(% change from 1990)	(5.9)	(6.1)	(5.5)	(5.4)	(5.8)	(6.0)	(4.4)	(4.9)
General farm overhead	12	10	7	4	10	23	16	25
Taxes and insurance	17	9	9	13	9	8	15	16
Cash interest	15	12	9	3	12	24	19	31
Total fixed expenses	43	32	25	20	32	55	51	71
(% change from 1990)	(2.6)	(2.6)	(2.6)	(3.0)	(2.6)	(2.7)	(2.6)	(2.5)
Total cash expenses	186	95	89	73	87	402	115	358
(% change from 1990)	(5.1)	(4.9)	(4.7)	(4.7)	(4.6)	(5.5)	(3.6)	(4.4)

Forecasts are as of 11/27/90. \* = less than 50 cents. Totals may not add due to rounding. 1/ Forecasts exclude direct effects of Government programs.

## Cost Control, Cautious Investment Strengthen Financial Position

*The combined effects of gradually increasing asset values and reduced debt loads have greatly lowered farmers' vulnerability to short-term income fluctuations.*

---

Slightly lower 1991 net incomes point toward a slowing in the rate of growth of the farm economy. Equity growth is expected to slow in 1991, as land values are forecast to rise by a modest 2 to 4 percent. Farm borrowing is not expected to increase significantly as a result of the slight drop in income. Nor is today's farm sector saddled with the debt servicing requirements that compounded the effects of income declines in the early 1980's. During the last half of the 1980's, farm debt decreased by almost \$60 billion.

### **Farm Asset Growth Negligible**

The value of U.S. farm assets (excluding operator households) rose \$24 billion during 1990, an increase of about 3 percent. Total assets are forecast to reach \$825 to \$835 billion in 1991, as the rate of growth slows to less than 2 percent. These changes are relatively modest compared with recent years, which may reflect a stabilizing agricultural economy. The real value of farm assets is projected to decline in 1990 and in 1991, as the general rate of inflation is anticipated to exceed the growth in asset values.

Farm real estate assets increased slightly less than \$18 billion during 1990. This modest 3-percent rise in total farmland value suggests that record cash income levels did not dramatically increase investors' expectations of long-run farm profitability. The projected income dip in 1991 should result in a land value appreciation rate of just 2 to 4 percent next year.

Nonreal estate asset values are forecast to rise by about \$5 billion in 1991, led by relatively stable prices for slightly rising livestock inventories. The value of machinery on farms and of financial assets is also projected to register slight increases in 1991, while inventory val-

ues of crops and purchased inputs are not expected to change.

### **Farm Debt Stable**

Total farm debt is projected to increase slightly during 1991. An increase would end a 7-year run of annual debt reductions. With land values strengthening, and repayment capacity of farm borrowers improving, lenders are less concerned with loan defaults arising from land value declines.

Commercial banks' agricultural lending is expected to rise by nearly \$2 billion in 1991, as banks report adequate credit availability for qualified borrowers. Farm Credit System nonreal estate lending is projected to increase during 1991, while FCS real estate debt will stabilize.

### **Farm Lender Shares Change**

Although farm business debt is forecast to increase only slightly during 1991, the loan portfolios of individual lenders may change dramatically. The decrease in debt held by the Farmers Home Administration (FmHA) should be more than offset by increased loan volumes of other farm credit sources.

As FmHA continues to resolve its problem loan portfolio, FmHA farm debt could fall by another \$2 to \$3 billion in 1991. On June 30, 1990, almost half of FmHA debt was owed by delinquent borrowers. Principal and interest payments delinquent more than 4 years totaled over \$5 billion.

In recent years, banks have gained market share through aggressive pursuit of limited-risk, high-quality mid- to large-scale farming operations. In the process, banks have lured away many of the Farm Credit System's most desirable borrowers. As FCS restructuring and recovery continues, the system is be-

coming more aggressive in regaining market share.

Commercial banks are expected to hold almost 36 percent of all farm debt by the end of 1991, while the Farm Credit System's share is anticipated to be less than 28 percent. This represents a reversal of 1984 market shares of these two lenders.

### **Farm Equity Growth Slight**

Farm equity is expected to be between \$695 and \$705 billion by the end of 1991, with growth for the year slowing to about 2 percent. For 1990, equity is estimated to have increased almost 4 percent. With these growth rates lagging the general inflation rate, real (\$ 1982) farm equity will decline slightly each year.

The nominal farm equity increase projected for 1991 will mark the fifth consecutive year of equity growth. From a peak of \$816 billion in 1980, farm equity declined more than \$280 billion by the end of 1986. About 60 percent of that equity loss will have been recovered by year-end 1991.

### **Cash Flow and Sector Returns**

Real cash flow after interest (\$ 1982) could fall to between \$36 and \$38 billion in 1991. This reflects somewhat lower real gross cash income. The ratio of debt to net cash flow is expected to fall from 2.8 in 1990 to 2.6 in 1991.

Other measures of financial performance reflect the anticipated slowing of the recovery process. Returns to operators, returns to farm assets, and returns to farm equity are expected to fall by about \$3 billion each in 1991. Nonetheless, the rates of return to farm equity and assets are still relatively high, and this is expected to continue through 1991.

Asset values are forecast to rise about 3 percent this year, due mainly to rising land values. With debt levels remaining fairly steady, equity should increase. Real cash flow after interest (\$ 1982) is expected to rise slightly in 1990 but fall somewhat in 1991. Relatively high rates of return to farm assets and equity are expected to continue through 1991. Farm debt compared with income flows to farm assets remains relatively low.

Table 3--Nominal balance sheet shows continuing improvement in 1991, but in real terms it is off slightly 1/

Year	Current dollars			Deflated dollars (\$ 1982) 2/		
	Assets	Liabilities	Equity	Assets	Liabilities	Equity
Billion dollars						
1988	763.5	137.6	625.9	629.4	137.6	516.0
1989	793.9	135.6	658.3	628.6	135.6	521.2
1990F	818	134	684	619	134	518
1991F	825 to 835	131 to 137	695 to 705	590 to 600	100 to 105	500 to 510

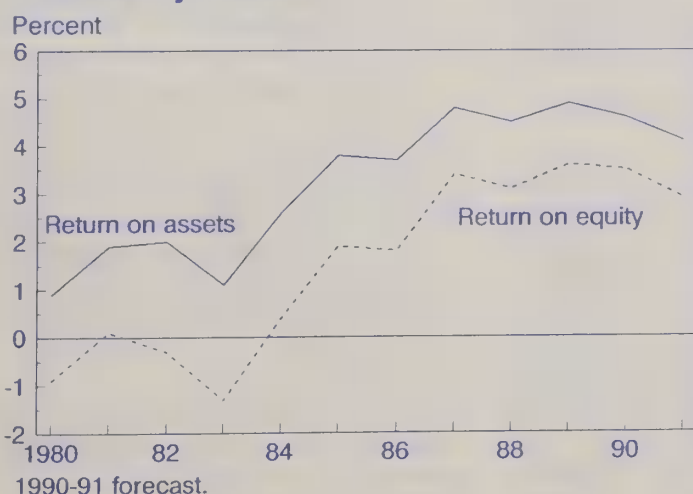
F = forecast. 1/ Excludes operator households and CCC commodity loans. 2/ Deflated by the GNP implicit price deflator, 1982 = 100.

Table 4--Flow of funds to the farm sector, 1986-1991F

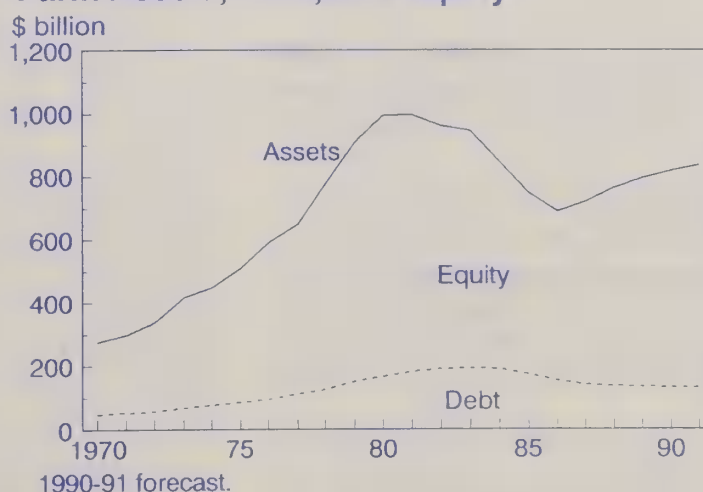
Income and Returns	1986	1987	1988	1989	1990F	1991F
Billion 1982 dollars						
Gross cash income	134	140	140	141	139	133 to 137
Plus: Change in loans outstanding	-17	-10	-4	-2	-1	-1 to 1
Plus: Net rent to nonoperator landlords	6	6	6	6	6	5 to 7
Plus: Net change in farmers' currency and demand deposits	1	*	*	*	*	*
Minus: Gross cash expenses (excluding interest)	78	80	81	86	84	82 to 86
Minus: Capital expenditures	7	9	9	10	11	9 to 11
Equals: Cash flow before interest payments	38	46	53	50	50	46 to 48
Minus: Interest payments	14	12	12	12	10	9 to 11
Equals: Cash flow after interest payments	23	34	41	38	39	36 to 38

F = forecast. \* = between \$.5 and -\$ .5 billion. Numbers may not add due to rounding.

## Profitability Ratios



## Farm Assets, Debt, and Equity



## State Credit Subsidy Programs for Agricultural Producers

by

George B. Wallace, Douglas G. Duncan, and James J. Mikesell<sup>1</sup>

**Abstract:** A number of States currently operate one or more agricultural credit programs. These programs provide financing on more favorable terms than private lenders would offer. The results of a 1989 mail survey indicate there is a continuing interest in serving the farming community, as the number of States offering programs, the volume of credit placed, and the subsequent credit subsidies all increased from 1988 to 1989. In fiscal 1989, States were providing approximately \$51 million in subsidies.

**Keywords:** Credit subsidy, credit program mechanisms, State credit programs

More than half the States have agricultural credit programs in place that provide various forms of subsidies to make financing either more accessible or less costly to farmers. Such programs are under consideration in a number of other States. The results of a 1989 survey of State government officials indicate there is considerable diversity in programs available to farmers. It would be beneficial to States both currently active and considering these programs to learn the pitfalls and successes encountered by States administering them.

This article has three broad objectives:

- To discuss what constitutes a credit subsidy;
- To describe the program mechanisms, geographic availability, and the subsidy costs incurred by State governments that have instituted credit programs; and
- To increase the awareness of program design and performance to guide those considering the establishment of new programs or the modification of existing ones.

### What Constitutes a Credit Subsidy?

A subsidy is defined as a gift of public money to a private person or company. It can be in the form of a direct grant or endowment or a sharing in the cost of

acquiring goods or services for a particular individual or group. In the case of State farm credit subsidy programs, the result is to make financing more readily available or to offer it at more favorable terms than those of private lenders. The degree to which a program affects the overall volume of available credit is difficult to measure (as is the subsidy associated with it), and is beyond the scope of this study.

Credit subsidies to borrowers involve a cost that must be borne by State governments through direct outlays, opportunity cost of foregone revenues, or risk of incurring future costs. The cost to governments is also a function of the effect of the program on the price and volume of credit available.

No program can both reduce the price of credit and increase credit availability without also incurring additional operating costs associated with credit risk and uncertainty. Program costs imply taxpayer burdens. Whether additional costs result in a corresponding increase in the value of the program to its users depends on the efficiency of the program's credit allocation. For this reason it is important that States design programs to complement the private sector's credit delivery system. Such programs provide incentives to encourage private lenders to make credit more available. The resulting cost is often opportunity cost of foregone revenue as opposed to direct cost involved when the State acts as a loan originator. In addition, such programs typically have lower administrative costs and distribute the risk of default over a broader base.

### Measuring Credit Subsidies

The measurement of credit subsidies may be conducted to capture one of several components, each presenting a different valuation of the subsidy (3). Under the "cost approach," the cost of the subsidies is viewed as the net loss of revenue to the State treasury in providing credit assistance. The value of at least three elements must be determined in measuring this cost (see reference 1, p.13): an estimate of the cost of funds to the State (interest paid or foregone); administrative expenses; and loss of revenues due to loan defaults and collection procedures.

Another method of subsidy measurement is the "benefits approach," which considers the benefits of credit assistance to the borrower as the subsidy. Since this is the valuation of the difference in payments between a loan from a strictly private source and the more attractive subsidized loan, it also represents the opportunity cost to the State of subsidizing the loan.

In this study, both methods of subsidy measurement were employed depending on the nature of the State credit program being evaluated. An additional issue is the question of whether to evaluate the subsidy on an annual basis, or capitalize it over the entire period of assistance to provide a current value of costs or benefits. In this study all applicable subsidy evaluations were estimated on an annualized basis, since this method has the advantage of reporting actual costs or benefits that occurred during the period observed.

<sup>1</sup> Wallace and Duncan are agricultural economists and Mikesell is a financial economist, Agriculture and Rural Economy Division, ERS.

## Reasons for State Involvement In Credit Subsidy Programs

States choose to incur the costs of farm credit programs for various reasons. The 1989 survey (described below) identified six major reasons: 1) complementing perceived deficiencies in Federal programs; 2) protecting or promoting the "family farm" as a socially desirable goal; 3) assisting a sector of the State's economy in periods of economic downturn; 4) encouraging the establishment of new types of agricultural enterprises; 5) providing capital for technological innovations; and, of course, 6) State politics.

States that have developed farm credit programs in recent years have nonetheless done so with the express intent of limiting potential risk exposure and minimizing State budget expenses. Numerous States have "balanced budget" provisions in their constitutions, and there has been a general inclination toward development of programs that are funded off-budget.

In addition, the Tax Reform Act of 1986 changed the tax status of State revenue bonds. In effect, the act eliminated the interest rate advantages of almost all programs that were funded by tax-exempt bonds. The act placed restrictions on bond qualification for tax-exempt status and eliminated the tax deductibility of interest that made the bonds attractive to commercial banks and other major purchasers of State bonds.

For this reason, there has been a steady decline in the adoption of programs whose funding was designed around tax-exempt bonds. States have increasingly opted for programs such as linked deposits, and "add-on" variations to Federal programs. Other reasons for moving toward these two types of programs include their administrative ease and borrower familiarity with the procedures of participating lenders and/or Federal programs.

## Relationship to Federal Programs

Federal programs that enhance the availability of farm credit have been a familiar feature of rural credit markets since the 1920's. These programs have

employed various subsidy mechanisms to promote income redistribution, economic growth, price stability, and capital availability. Examples include low-interest loan programs of the Farmers Home Administration, the Government's implicit guaranty of Farm Credit System securities, and regulatory allowance for seasonality in the lending patterns of agricultural banks.

By comparison, State involvement in such programs has been limited until recent years. Examples include farm loan programs of the Wyoming Farm Loan Board and of the Oklahoma Commissioners of the Land Office (4). Since the 1970's, interest has grown in State programs aimed at augmenting programs operated by the Federal Government. The earliest of these State programs were primarily designed to aid beginning farmers in becoming landowners, although programs of a more general nature have come and gone as perceived needs have changed. Many of the State credit programs currently in operation came about in response to the financial stress in the farm sector in the early and mid-1980's.

State credit subsidies are small compared to those of the Federal Government. For example, in 1987 and 1988, total State subsidies amounted to roughly 2 percent of Federal credit program subsidies to farmers. Despite their small size relative to Federal credit programs, any amount can be considered significant at a time when many State budgets are incurring deficits (2). In fact, State programs have, in general, been better able to target aid to specific needs and therefore make more efficient use of each dollar invested (5).

## Data and Methodology

Information about State outlays for existing credit programs was obtained through a mail survey of State government officials conducted in late 1989. The survey questionnaire was designed to solicit information about State programs that assist farmers by making agricultural credit either more accessible or less costly. Respondents were asked to complete a separate questionnaire regarding description and costs for each program that 1) provided incentives to increase private sector agricultural lending, 2) reduced the borrower cost of

agricultural credit, or 3) provided direct agricultural loans or grants from the State government or its agencies. Incomplete survey questionnaires were supplemented by phone contacts.

State credit programs of interest in this study were characterized as "active" sometime during calendar years 1987 and 1988 or fiscal years 1988 and 1989. To be considered active, a program had to satisfy at least one of the following conditions: 1) have placed loans; 2) have restructured loans; 3) have experienced losses; or 4) have incurred outstanding loans or obligations that either lowered the borrower's cost of funds or involved an expense to the State.

In addition, credit programs had to be "agricultural" and "State sponsored." This means that qualifying programs had to 1) be operated or funded by the State government or a principal State agent, 2) be structured in such a way as to alter directly the credit options or terms available to commercial farmers, and 3) be targeted at financing on-farm production activities. These requirements effectively excluded programs operated solely through the Federal Government or whose sole purpose involved financing outside the scope of activities of agricultural producers (market enhancement programs, for example, would be excluded). Also excluded from those surveyed were non-credit programs limited to providing a public service, such as farm financial stress "hotlines."

## Program Characteristics and Trends

Credit subsidies can be delivered through a variety of mechanisms. Each form of credit assistance has different implications for the cost to the State budget, the distribution of benefits, and the effectiveness and efficiency of achieving objectives. Although the various State credit programs have many characteristics in common, they demonstrate considerable innovation in program design.

In addition, a State policy action depends on the general attitude of voters, on the State's current economic climate, and on Federal policy, e.g., the Tax Reform Act of 1986. Consequently, the time frame in which a State enacts leg-

isolation to initiate or modify a program is an important determinant of the appropriate mechanism for attaining the program's goals. The survey questionnaire identified 14 program mechanisms and asked State program representatives to indicate which were employed in their programs (table A-1).

## Highlighted Program Types

While the survey identified 14 mechanisms for conducting State-level credit programs, most of the programs fell into one of four types.

### Linked deposits

In a linked-deposit program, the State allocates a portion of its investment portfolio to stimulate agricultural lending. The State treasurer is allowed to deposit State tax revenues with approved lenders that are willing to make specific loans. Thus, the deposits are "linked" to a specific use. In the case of commercial banks, for example, the State invests in low-yielding certificates of deposit (CD's). In the case of Farm Credit System institutions, the State

purchases Farm Credit System (FCS) bonds.

In general, participating lenders are required to pass part or all of the subsequent interest cost savings on to qualified borrowers in the form of below-market-rate loans. Sometimes the loans made are at or near market rates, usually to borrowers considered higher risks. In some programs, as long as a lending institution is willing to meet certain agricultural loan volume targets, the State treasury agrees to purchase CD's or to deposit funds with such lenders, and accept below-market rates.

This type of program is attractive because it requires no direct on-budget outlays for funding. However, the State may incur a substantial opportunity cost amounting to the revenue foregone on CD's or FCS bonds that are earning below-market interest rates. For example, if the State treasurer purchases a CD from a commercial bank at 3 percent interest and alternative investments approach the yield on riskless 6-month Treasuries (around 7 percent in 1988), then the State is earning 4 percent less

on its money than it otherwise would. It is estimated that, for the 13 States with linked-deposit programs, this interest rate differential resulted in total foregone income of just over \$15 million in 1988.

During the late 1980's, linked-deposit programs represented a popular and innovative mechanism by which States responded to increasing pressure to provide credit assistance to their farm populations. One important reason for the popularity of these programs was the low risk to the State treasuries. Typically, the State treasurer's office requires each participating lender to provide a high-quality negotiable asset at least equal in value to the linked deposit. In 1987 and 1988, linked-deposit programs are estimated to have accounted for 23 and 29 percent of total State credit program subsidies.

### Direct loans

Direct loan programs are a traditional mechanism for State involvement in agricultural credit and have been used for a wide variety of purposes. In a direct

Table A-1--Mechanisms used by States to provide credit assistance to farmers

Mechanism	Description
Buy-down	Direct payments are made to lenders in return for preferential loan terms to borrowers
Direct loan	Loans are made directly by the State government or its principal agent to farmer borrowers
Deferral	Interest and/or principal payments on farm loans are delayed beyond normal repayment dates
Linked deposit	Lenders make farm loans at preferential terms as a condition of States having placed treasury deposits at below-market interest rates
Guarantee/Insurance	The State guarantees or insures lenders against some or all losses in the event of borrower default on farm loans
Forgiveness	Repayment of a portion of the balance on a farm loan is not required, or the accrual interest is halted for a specified period
Grant	State funds are transferred directly to farmers with no recourse by the State
Revolving fund	Loan fund is established by an initial endowment that makes and services agricultural loans on a continuing basis--borrower payments are redeposited in the fund
Legal award distribution	Loans or grants are made to farmers, funded by a legal settlement awarded to the State
Restructures	Farm loans are rewritten so that the borrower's cost is lower than under the original contract, with the State absorbing some or all of the reduced return to the lender, perhaps by providing a loan guarantee on part of the remaining balance
Add-ons	The State adds to the terms of an existing Federal agricultural program, making program loans more attractive to the borrower
Secondary market	The State purchases farm loans from lenders and holds or resells them
Tax credit	State extends a tax credit to agricultural lenders to encourage lending or to reimburse losses on agricultural loans
Shared loan	A loan from the State is combined with one from a private sector lender, with preferential terms on the State portion

loan program, the State acts as the originator and also services the loan. This may be accomplished either directly by the State or through an established principal agent.

As with the linked-deposit program, variations on the mechanism exist. The government agency charged with administering the program varies by State as does method of funding (e.g., direct appropriations, some form of revenue bond, or a revolving fund) and selection of loan interest rates and terms. One consistent characteristic of direct loan programs is the targeting of one or more segments of the farm borrower market whose participation is not necessarily tied to financial condition. Specifically, this kind of program is designed to provide funds to new borrowers or to borrowers who are determined to be a viable credit risk for the State but are unable to obtain financing through traditional farm lenders.

### Loan Guarantees

Under this type of program the State guarantees participating lenders against a specified percentage of any incurred

losses. In practical terms the State acts as a cosigner on 80 to 90 percent of the loan. The effect is to make credit available to borrowers who might otherwise be considered to have too high a probability of default. In the event of default, the State would purchase the guaranteed portion of the loan from the loan's originator. This could be either principal or principal plus interest depending on the terms of the loan guarantee agreement. By reducing the lender risk involved in making such a loan, the State is reducing the cost or increasing the volume of funds available to the borrower.

One problem with this type of program, because of the inherent likelihood of some losses, is that the State may be reluctant to shoulder the risk involved. This has the effect of reducing participation by both borrowers and lenders. However, a positive point of such a program is that no immediate direct budget outlays are required, and none will ever be needed if no losses occur.

### Add-on Programs

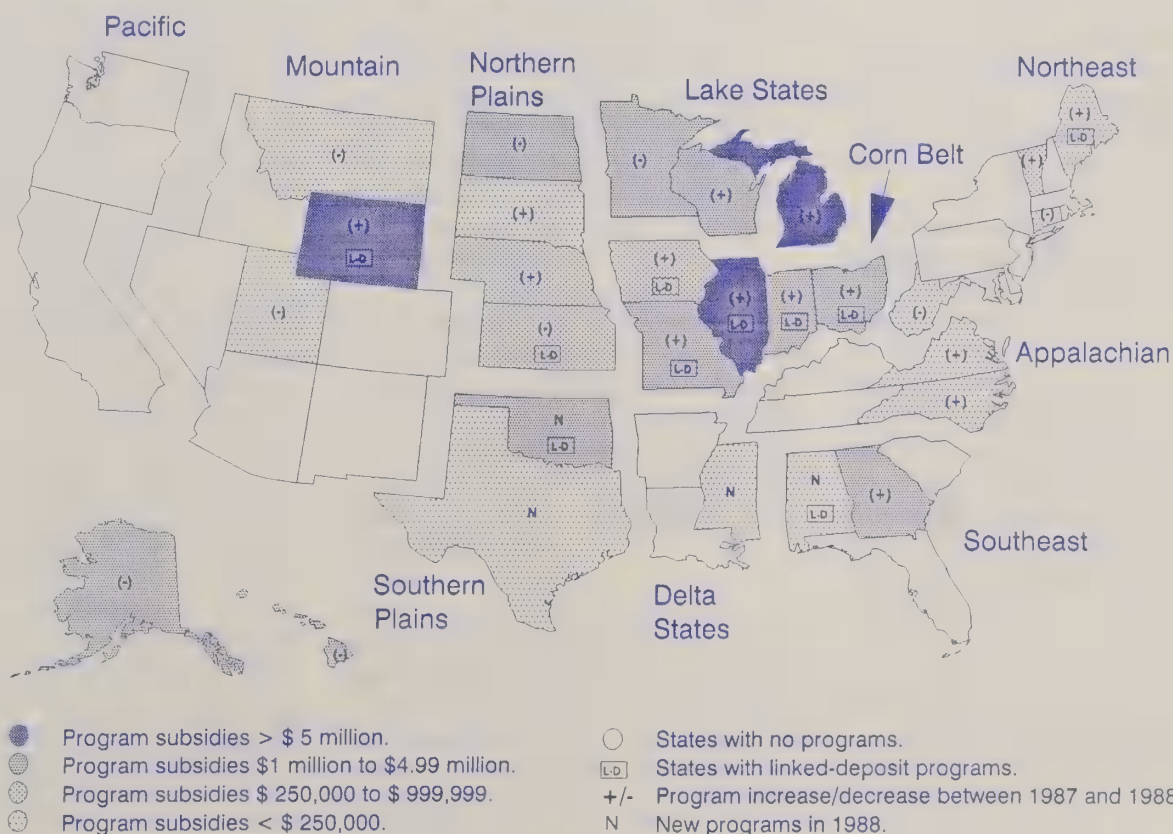
Add-on programs typically are designed around "piggy-backing" on an

existing Federal agricultural program. One way this could work is if a bank already holds a loan made under the terms of the Farmers Home Administration's loan guarantee program, the State would lower the risk of default by buying down the interest rate (e.g., paying 2 percent) on the loan. Add-on programs have enjoyed increased popularity because of their low budget exposure and administrative ease, and the borrowers' familiarity with existing Federal programs. It is also argued that the State has a high level of efficiency on funds expended since Federal monies comprise most of the subsidy.

### Existing State Programs

In 1987 and 1988 (fiscal 1988, 1989), State farm credit programs were available in 24 and 28 States (see figure). In 1987, total State credit program subsidies to the agricultural sector were about \$50 million. Of this amount, about 28 percent was expended in the Corn Belt. In 1988, total State subsidies for agricultural credit were about \$51 million, and Corn Belt States incurred 31 percent of this cost. Fifteen States spent more

States with Farm Credit Subsidy Programs in 1988



on credit expansion in 1988 than in 1987. Alabama, Mississippi, Oklahoma, and Texas had newly active programs in 1988.

Linked-deposit programs have grown in importance as a mechanism of State involvement in agricultural credit. In 1987, eight States had linked-deposit programs with a total cost of approximately \$12 million. In 1988, two more States activated linked-deposit programs, and total opportunity cost increased to around \$15 million (or 29 percent of total State-level credit subsidies for that year). In addition, Montana, South Dakota, and Texas had authorized linked-deposit programs by 1988, but no State outlays had been made as of the survey period.

The earliest States to activate credit programs on a significant scale were those States that first experienced serious economic downturns in their agricultural economies. The Corn Belt, Lake, and Northern Plains States have the most active programs in terms of number of programs and dollar concentration.

This corresponds to the tremendous reversals in land values that occurred in the early to mid-1980's in these regions, particularly in the Corn Belt. As the farm financial crisis spread south and west, other States added programs, but with the exception of Wyoming, these States have made a much smaller financial commitment.

### Summary

The number of States with active agricultural credit programs points to a continuing interest in serving the farming community through credit programs. With increasing pressure on State budgets, program development will mean continued movement away from mechanisms that directly expose the State to budget outlays, and toward increased adoption of off-budget items or indirect State expenses.

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## Sources of Revisions to the USDA Income Accounts

by  
Roger Strickland and Cheryl Johnson<sup>1</sup>

**Abstract:** USDA's income accounts were revised substantially in 1990 reflecting the availability of additional data and changes to estimation concepts and procedures. The current estimates for major components of the income accounts are presented for years 1983-89, along with the former values, and the extent of the change.

**Keywords:** Farm income, data revisions

Every 5 years, the income accounts of the U.S. Department of Agriculture (USDA) are subject to extensive revisions as data from the most recent Census of Agriculture are incorporated. For some components of the income accounts, estimates for years since the last census are derived by "benchmarking" procedures.<sup>2</sup> Because the census data are released 2 to 3 years after collection, revisions back to the prior census year involve 7 to 8 years.

In addition to incorporating 1987 census data into the income accounts, USDA is incorporating other revisions in data as well as in methods. For some time, USDA's Economic Research Service (ERS) has been concerned about the validity of the building values, the depreciation method employed for building values, and some of the assumptions underlying the imputation of income from the farm sector's equity capital in housing. These issues have been studied for almost 2 years, and it was decided to incorporate all revisions to data and methods simultaneously.

In addition, the method USDA used to incorporate administrative data regarding Commodity Credit Corporation (CCC) loan transactions has become increasingly inappropriate in recent years.

The method employed over several decades, using what is commonly referred to as "net CCC" data, permitted considerable savings of effort and costs in storage and processing of the CCC data. However, changes in both the form and focus of the incentives offered to farmers participating in the commodity programs led participants to respond in ways that rendered the "net CCC" procedure unacceptable. With the publication of the 1989 income accounts, a new method was implemented for separately incorporating the CCC transactions for loans made (placed) and loans redeemed.

### Evolution of Data Sources

USDA's farm income estimates are sector-wide measures used as indicators and for the analysis of financial status and trends in the U.S. farm sector. They are incorporated into the gross national product (GNP) and National Income and Product Accounts by the U.S. Department of Commerce to reflect the agricultural sector's contribution to the national economy.

One measure of farm income, net farm income, is designed specifically for compatibility with the GNP. It measures the net contribution of the sector to the national economy, in the form of production of goods and services less production-related expenditures made to nonfarm sectors.

The sector-wide income series must account for all production-related financial activities that occur within the agricultural sector. Because income measures are essentially derived as residuals from gross income less total expenses, the estimate of all income and expense

components must be included. The necessity for a complete accounting does not allow the analyst the luxury of including data exclusively from those sources that are considered statistically reliable. The "best available" data are used for each component of income and expenditures; where actual data are not available, they are estimated.

Gathering quality production and financial data is expensive, and data gathering agencies and activities have to compete for scarce dollars. Data that reflect directly on the performance of specific Government programs garner the most support in the legislative process. For example, production data for commodities covered by support programs are far more abundant and reliable.

During the 1970's, the quality of farm financial data available to USDA analysts declined. For example, the 1982 Census of Agriculture dropped a number of financial questions and a financial follow-on survey was discontinued. During the same period, USDA discontinued the collection of data for numerous vegetables and for feed crops used on farms where produced.

By the early to mid-1980's, ERS and USDA's National Agricultural Statistics Service (NASS) renewed its emphasis on improving the data base and the income estimation procedures. Perhaps the most significant was the development of the Farm Costs and Returns Survey (FCRS).<sup>3</sup> For the past 6 years,

<sup>3</sup> The FCRS is a probability survey. Results are statistical indications of the true level of income or expenses that would be obtained if all farms were surveyed.

<sup>1</sup> Agricultural economists, Agriculture and Rural Economy Division, ERS.

<sup>2</sup> A "benchmark" is something that serves as a standard by which others may be measured—a point of reference from which measurements may be made. A "benchmark mover" is a ratio estimated from secondary data used to adjust a benchmark. ERS uses the Census of Agriculture as a benchmark and the Farm Costs and Returns Survey as a benchmark mover.

this survey has addressed data issues related to farm income and expenses, farm household income, farm building and land values, and income from contracting.

ERS and NASS have also supported a cooperative data development process for the numerous minor commodities, which collectively account for some \$14 billion of gross farm income. The frequency of collecting labor data has also been increased. As urged by ERS, questions were added to the 1987 Census of Agriculture to collect data on income from miscellaneous sources (particularly income that is not commodity based) and data on several additional categories of expenses as well as a "catch-all" category of residual expenses not specifically itemized on the questionnaire. The latter item is important to ensure a complete accounting of sector expenses.

A significant addition was the resumption of a follow-on survey to the 1987 census, the Agricultural Economics and Land Ownership Survey (AELOS), to collect data on landlords and farm buildings. Such information had not been collected in a decade. Unfortunately, the publication of the survey results came too late in 1990 to allow incorporation in the income accounts for 1989.

## 1987 Census of Agriculture

Many expense accounts are benchmarked to the Census of Agriculture which is published every 5 years. During years for which the Census of Agriculture is not published, ERS uses benchmark movers (e.g., FCRS) in many of its estimation procedures. Because the census generally does not collect data for all components of the income accounts, other data sources are also used. Analysts must use judgments in evaluating alternative sources for data computation and the "best available" data.

Where applicable, components of the total production expense account for the 1987 Census of Agriculture have been incorporated directly into the production expense accounts for farm income. For the intercensus years, 1983-86, components for the income accounts have been reevaluated to see if revisions were warranted. For the 1988 and 1989

income expense accounts, benchmarks were updated, and accounts reestimated.

Among the expense categories previously benchmarked to the 1982 census and revised with the 1987 census data are those for feed, seed, fertilizer and lime, pesticides, fuel and oil, electricity, machine hire, and custom work. The feed and fertilizer categories were subjected to major revisions in more recent years, as the U.S. farm sector experienced substantial changes in the 7 years since the 1982 census.

The 1987 census was also a source of additional revisions for expense items not previously collected, including repair and maintenance expenses, property taxes, and cash rent to nonoperator landlords. For 1987, census data for these expenses were substituted for prior sources and then benchmarked for 1988-89 using the FCRS, thus contributing to revisions.

The 1987 census did not signal substantial changes to gross farm income. Cash receipts account for a large majority of gross farm income and are based on production, price, and marketing statistics from NASS. The NASS data are survey based and are usually not subject to major revisions following an agricultural census.

The historical income accounts are estimated at the State level and then summed to the national level. Revisions are made as part of the next annual estimation cycle and released in August of each year. The AELOS may contribute additional insight into the revisions to some expense components suggested by the census results and will provide data on other components, particularly real estate and perhaps hired labor.

## Accounting for CCC Loan Transactions

Net CCC loans are considered sales of commodities to the Government. At the time a commodity is placed under loan it is considered a sale and is included in farmers' total cash receipts along with the open market sale of crops. Placement of crops with the CCC is deemed a "sale" because the decision to repay

the loan and redeem the commodity is strictly the producer's.

Historically, farmers within a particular State would not have placed and redeemed large quantities of a commodity within a given month. This is because producers' decisions were based primarily on whether market prices were above or below loan rates. Because of the market-based nature of the decisions, ERS' income data base used monthly data on CCC loan activity that were based on the net difference between CCC placements and redemptions within States. In essence, monthly net CCC data for individual States represented either placements (+) or redemptions (-).

In recent years, changes in farm programs often gave farmers incentives to conduct large dollar amounts of both types of transactions within the same time period. Beginning in the mid-1980's, there was a trend toward lower CCC loan rates and the introduction of commodity certificates that reduced quantities of commodities forfeited to the CCC. These changes gave farmers the incentive to both place and redeem large quantities of commodities more quickly. The result was that net CCC loan placement activities began to be less useful for ERS's annual income estimates.

Farmers choose to redeem commodities placed under loan if they can realize a financial gain in doing so. Before certificates, farmers redeemed commodities when the market price was above the loan rate of the commodities under loan (plus interest). After the introduction of certificates, the traditional 9-month non-recourse loan program operated more like marketing loan programs and provided incentives for farmers to cycle their crop through the loan program more quickly. In the latter situation, some of the benefits would be reflected in Government payments accounts; the net difference in placements and redemptions would often be largely offsetting and preclude an accounting of the profit from disposition of commodities redeemed. Another problem was the timing of the transactions, since the accounting for farm income is for calendar years, and data for major crops are reported for crop years.

For these reasons, ERS has switched to the concept of treating loan placements and redemptions separately in the estimation of cash receipts, beginning with 1986. This procedural change has been implemented to achieve more accurate accounting and timing of placements and redemptions in estimating cash receipts. This has resulted in substantial revisions to cash receipts and inventory adjustments (table B-1).

Gross and net cash incomes present a different situation. The procedural change can have a significant effect on cash incomes, since these measures of cash transactions do not reflect inventory adjustments and thus contain no offset to changes in sales resulting from the revision in procedure. Only the changes shown for receipts would have an impact on the cash accounts.

### **Imputed Rental Value of Farm Residences**

The gross imputed rental value of farm dwellings is an estimate of the value of housing services furnished by the farm business. The rental value must be imputed because there is no information available regarding rental transactions between the landowners and farm operators. Rental values must also be imputed for farm dwellings because data are not available to separate the rent paid for farm dwellings from the rent paid for all real estate.

Based on the old ERS procedures, the gross imputed rental value of farm dwellings was equal to the sum of: 1) product of the mortgage interest rate and the value of farm dwellings; 2) depreciation expense, accidental damage, and repairs; 3) property tax; and 4) insurance expense less indemnities received. The validity of three components of this estimation process for imputing the net rent of operators' dwellings has been of concern to ERS analysts for some time. These components are the mortgage interest rate, dwelling values, and the depreciation rate.

The most recent estimates for operators' dwelling values were collected in the 1979 Farm Finance Survey, the follow-on survey to the 1978 Census of Agriculture. Since 1979, a benchmark ratio of operators' dwelling values to total real estate values derived from the 1979 survey has been multiplied by the annual ERS estimate of real estate value to compute the values of farm operator dwellings. This was then multiplied by the mortgage interest rate estimated by ERS to estimate the interest expense plus return on equity. In this old procedure, the average farm mortgage interest rate for real estate was substituted for the rate of return on equity. This constant ratio procedure is now believed to have substantially underestimated dwelling values in recent years when farmland values were declining.

A new method for estimating the imputed rental value of farm dwellings, the market-observed rent concept, corresponds with methods used by the Department of Commerce in imputing the rental value of owner-occupied housing in the nonfarm sector. Most data for both the income and expense components of imputed rent on farm dwellings are now from the FCRS. This has the advantage of increasing the consistency of the data, whereas prior calculation procedures derived data from several accounts.

The concept of applying the declining balance method for computing depreciation to the capital stock of farm dwellings has been abandoned because of the degradation in housing data over time. The method ERS now uses is also a type of declining balance method, but the depreciation rate of 2 percent is applied to the current market value of capital stock, which already reflects depreciation. The source of the current market value of farm buildings, including dwellings, is the FCRS.

### **What Do Revisions Show?**

With the revisions applied, gross cash income shows a \$2.3-billion increase in

1987 due to a \$2.2-billion increase in cash receipts. For 5 out of the 7 years for which income and expense accounts were revised, gross cash income rose. Cash receipts rose substantially in 1987 due to a CCC procedural change in calculation. After cash receipts were reestimated, a different marketing pattern developed, shifting sales between years, and the accounting for the premium (a profit) on commodities reelected increased substantially. The largest revision to cash receipts (\$2.2 billion) occurred in 1987, but the revision to the value of the change in inventory largely offset the revision to cash receipts for all years 1986-89.

For 1984-89, the period for which gross farm income was revised, there was a decline. Net farm income declined for the same years. The decrease is attributed to a decline in nonmoney income. Gross imputed rental value of farm dwellings, a component of nonmoney income, was revised downward, reflecting the change in data sources and computational procedure. The new estimate of imputed rent and the revisions for earlier years reflect two significant changes: substantially higher valuations for farm dwellings and a rent-to-value that is much smaller than the opportunity cost formerly used. The extent of revisions on the nonmoney account range from \$2.5 billion to \$4.7 billion.

The off-farm income account shows major revisions for years 1985-89. From 1979 to 1984, the off-farm income account was calculated by benchmarking to the 1979 Farm Finance Survey. Beginning in 1985, the FCRS asked farmers to report off-farm income on a range scale rather than giving the exact amount. Following this change, more farmers reported their off-farm income. In 1985, there was a 41-percent increase in off-farm income reported.

Table B-1--Revisions in farm income estimates 1/

	Calendar year						
	1983	1984	1985	1986	1987	1988	1989
Billion dollars							
1. Cash receipts							
Previous	136.6	142.4	144.1	135.5	139.5	151.4	157.0
Current	136.8	142.8	144.1	135.2	141.7	150.2	159.2
Change	.2	.4	.0	-.3	2.2	-1.2	2.2
Crops							
Previous	67.1	69.5	74.3	64.0	63.8	72.6	74.0
Current	67.2	69.9	74.3	63.7	65.6	71.4	75.4
Change	.1	.4	.0	-.3	1.8	-1.2	1.4
Livestock							
Previous	69.4	73.0	69.8	71.5	75.7	78.9	83.0
Current	69.6	72.9	69.8	71.5	76.0	78.8	83.7
Change	.2	-.1	.0	.0	.3	-.1	.7
2. Farm-related income							
Previous	4.5	4.4	5.0	5.1	5.8	5.7	6.0
Current	4.0	3.8	4.6	4.5	5.1	5.0	6.6
Change	-.5	-.6	-.4	-.6	-.7	-.7	.6
3. Direct Government payments							
Previous	9.3	8.4	7.7	11.8	16.7	14.5	11.0
Current	9.3	8.4	7.7	11.8	16.7	14.5	11.0
Change	.0	.0	.0	.0	.0	.0	.0
4. Gross cash income							
Previous	150.4	155.3	156.9	152.5	162.0	171.6	174.0
Current	150.6	155.5	157.2	152.0	164.3	170.4	177.5
Change	.2	.2	.3	-.5	2.3	-1.2	3.5
5. Nonmoney income 2/							
Previous	13.5	13.4	11.8	10.6	10.0	10.3	10.0
Current	13.5	8.7	8.0	6.9	7.5	7.5	7.3
Change	.0	-4.7	-3.8	-3.7	-2.5	-2.8	-2.7
6. Value of inventory change							
Previous	-10.9	6.3	-2.4	-2.7	-.4	-4.3	7.0
Current	-10.9	6.0	-2.3	-2.4	-2.8	-4.1	4.4
Change	.0	-.3	.1	.3	-2.4	.2	-2.6
7. Gross farm income							
Previous	153.1	174.9	166.4	160.4	171.6	177.6	192.0
Current	153.2	170.2	162.9	156.5	169.0	173.8	189.2
Change	.1	-4.7	-3.5	-3.9	-2.6	-3.8	-2.8
8. Cash expenses 3/							
Previous	113.5	116.6	110.2	100.7	104.3	111.7	121.0
Current	111.0	119.0	109.3	105.2	108.2	112.3	122.8
Change	-2.5	2.4	-.9	4.5	3.9	.6	1.8
9. Total expenses							
Previous	140.4	142.7	134.0	122.4	124.5	132.0	143.0
Current	137.9	143.8	131.9	125.5	127.7	132.1	142.6
Change	-2.5	1.1	-2.1	3.1	3.2	.1	-.4
10. Net cash income 4/							
Previous	36.9	38.7	46.7	51.8	57.7	59.9	53.0
Current	39.5	36.6	47.9	46.7	56.1	58.1	54.6
Change	2.6	-2.1	1.2	-5.1	-1.6	-1.8	1.6
11. Net farm income 5/							
Previous	12.7	32.2	32.4	38.0	47.1	45.7	49.0
Current	15.3	26.3	31.0	31.0	41.3	41.8	46.7
Change	2.6	-5.9	-1.4	-7.0	-5.8	-3.9	-2.3
12. Off-farm income							
Previous	37.0	38.9	42.6	44.6	46.8	51.7	54.0
Current	37.0	39.2	55.2	54.5	56.9	57.7	57.5
Change	.0	.3	12.6	9.9	10.1	6.0	3.5

Totals may not add due to rounding. 1/ The income statistics noted as previous were published in the May 1990 issue of Agricultural Outlook (table 32), with the statistics for 1986-88 being originally from Economic Indicators of the Farm Sector: National Financial Summary 1988. The statistics noted as previous were forecast for 1989. The income statistics noted as current were as of December 1, 1990. 2/ Value of home consumption of self-produced food and imputed gross rental value of farm dwellings. 3/ Excludes capital consumption, perquisites to hired labor, and farm household expenses. 4/ Excludes farm residences. 5/ Farm sector defined as including farm residence.

## Which Farmers Will Be Most Affected by Increasing Oil Prices?

by  
John E. Jenkins and Robert Dubman<sup>1</sup>

**Abstract:** Cash grain producers, the largest aggregate agricultural users of diesel fuel and gasoline, have almost 8 percent of their total cash expenditures made up of purchases of diesel and gas. Grain producers will thus be among those most affected in the short run by increased oil prices. Farmers and ranchers who purchase large amounts of fuel will likely obtain discounts, but still have to face increased expense. Oil-price-driven inflation will affect both commodity and input prices, making long-term implications for the profitability of agriculture uncertain.

**Keywords:** Fuel prices, farm type, cash expenses

Fuel price increases, like those we are currently seeing, can have dramatic impacts on U.S. agriculture. Expenditures on all types of fuels and lubricants made up more than 5 percent of the total cash costs of farmers in 1989. If sustained, high crude oil prices will also have a ripple effect on prices for chemicals, fertilizer, and other agricultural inputs. Recent conditions in the oil market are raising concerns in the farming sector.

Table C-1--Diesel fuel prices by region and amount of fuel purchased

Region	Gallons of diesel fuel purchased		
	less than 1,000	1,000 to 4,999	5,000 or more
	Cents per gallon		
Northeast	93	90	86
Midwest	89	84	79
Southeast	92	88	79
South Central	80	80	72
West	95	87	83
U.S.	90	85	79

Source: 1989 Farm Costs and Returns Survey, USDA.

This article compares the costs of diesel fuel and gasoline used on different types of farms. Diesel price variations among regions and by amount purchased will also be examined. These comparisons offer insights into which groups of farmers appear more vulnerable to increasing oil costs in the short run. The long-term effects of rising energy prices on net farm income are more uncertain. Most information presented in this article is from the 1989 Farm Costs and Returns Survey, which sampled over 11,000 farms in the 48 contiguous States.

### Diesel Fuel Prices Vary by Region and Amount Used

Diesel is the predominant fuel used in agriculture. In 1989 the \$2.1 billion farmers spent on diesel accounted for 48 percent of the value of all agricultural fuel and lubricant use. Gasoline, both bulk delivered and purchased off farm,

made up about one-third of agricultural fuel expenditures (1).

Diesel fuel prices show considerable variation across regions and by amount purchased (table C-1).<sup>2</sup> Because of bulk purchase discounts, per-gallon prices generally decline as the annual amount of fuel purchased increases. In 1989, Midwestern producers who purchased more than 5,000 gallons, for example, paid about 11 percent less per gallon than those who purchased under 1,000 gallons.

Farmers in the oil producing South Central States paid the lowest average price for diesel in all categories of "gallons of diesel fuel purchased." Northeastern producers generally paid the highest diesel fuel prices in 1989. Differences in distribution costs and State tax structures are likely responsible for a portion of the regional variations in diesel fuel prices.

### Fuel Cost Proportion Highest for Cash Grain, Cotton Farms

Higher oil prices will cause larger initial increases in the costs of grain and fiber production than in expenses for vegetable and livestock production. On average, 5.2 percent of cash expenses of all agricultural producers go for diesel fuel and gasoline, but for grain farmers it is 7.7 percent, the highest percentage of any commodity group (table C-2). Livestock producers had a smaller-

Table C-2--Diesel and gasoline as percent of total cash expenses, by farm type

Farm type	Percent
Cash grain	7.7
Tobacco	10.4
Cotton	6.2
Other field crops	6.4
Vegetable, fruit, nut	3.9
Nursery, greenhouse	5.7
Beef, hog, sheep	4.0
Poultry	3.9
Dairy	3.4
All farms	5.2

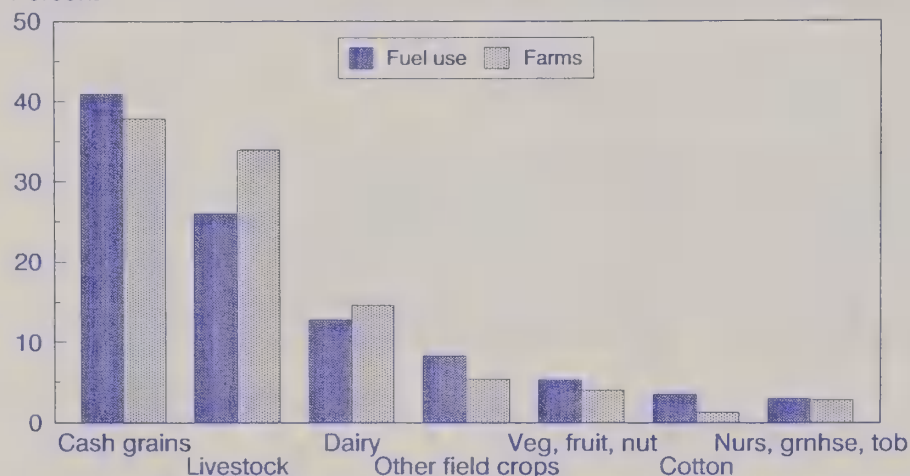
Source: 1989 Farm Costs and Returns Survey, USDA.

<sup>1</sup> Agricultural economists, Agriculture and Rural Economy Division, ERS.

<sup>2</sup> See map on page 6 for the States included in each region.

## Grain Growers Use Most Fuel

Percent



Source: 1989 FCRS, USDA.

than-average percentage of costs going to fuels (3 to 4 percent). In reality, farmers usually have a mixture of enterprises so, for example, a portion of the fuel expenditure of livestock producers could be for the production of forage or grains. Fuel use for irrigation and for drying is a factor that explains the higher fuel expenses of crop farmers.

Increases in petroleum prices will be followed by increasing costs for fertilizer, agricultural chemicals, and transportation of commodities. Even producers with a small percentage of expenses for purchases of diesel and gasoline will be affected by the second wave of cost increases driven by rising petroleum prices.

### Cash Grain and Livestock Producers Use Most Fuel

The proportion of farms belonging to each commodity group and the percentage of diesel fuel and gasoline used by each commodity group are roughly equivalent (see figure). Farmers spe-

cializing in cash grains made up 37.9 percent of producers interviewed for the 1989 Farm Costs and Returns Survey and accounted for 41 percent of all diesel fuel and gasoline use by agriculture, the highest percentage of any commodity group.

This is further evidence that a large proportion of the initial impacts of increased oil prices will be concentrated among cash grain producers, who also have one of the highest ratios of diesel fuel and gasoline expenditures to total cash expenditures. Agriculturally dependent local economies in areas where there are large numbers of cash grain farmers, such as the Midwest, may be especially affected by increased oil prices.

### Many Heavy Fuel Users Already on Shaky Financial Ground

Producers who are already in a precarious financial position and who continue to use large amounts of petroleum-

Table C-3--Comparing top 25 percent of fuel users with all farms, by financial condition

Financial condition	High fuel use farms	All farms
Percent of farms		
Favorable	63.2	62.4
Marginal income	19.0	26.2
Marginal solvency	12.0	6.8
Vulnerable	5.8	4.6

Source: 1989 Farm Costs and Returns Survey, USDA.

based fuels will need to adjust to remain competitive. Table C-3 compares the financial condition of farmers who were among the top 25 percent in combined expenditures for diesel fuel and gasoline in 1989 with the financial condition of all farmers.<sup>3</sup> The high-fuel-use group spent at least \$2,300 per farm on diesel fuel and gasoline. About 6 percent of the group was in a vulnerable financial position in 1989, a slightly higher percentage than that observed for all producers.

## Reference

1. U.S. Department of Agriculture, Economic Research Service. *Agricultural Resources - Inputs - Situation and Outlook*. AR-20, Oct. 1990.

<sup>3</sup> Low-debt (debt/asset ratio .40 or less) farms with positive incomes are classified as **favorable**; those with negative incomes are classified as having **marginal income**. High-debt farms with positive incomes are **marginally solvent**; those with negative incomes, **vulnerable**.

Appendix table 1--Farm income, assets and debt, and returns, 1986-91

Item	1986	1987	1988	1989	1990F	1991F
Billion dollars						
Income and total returns:						
1. Gross farm income 1/	151	163	167	183	187	188 to 192
2. Wages and perquisites to hired labor	9	10	10	10	12	12 to 13
3. Other operating expenses, excluding interest	74	78	82	90	90	92 to 96
4. Capital consumption	16	14	15	15	16	15 to 17
5. Net income from assets and operators' labor and management (1-2-3-4) 2/	53	61	61	67	70	65 to 69
6. Income imputed to operators' labor and management	24	24	25	26	29	27 to 31
7. Residual income to assets (5-6)	29	37	36	42	41	36 to 40
8. Real capital gain to assets	-46	3	22	-1	-17	-28 to -32
9. Total return from assets (7+8)	-17	40	58	41	24	6 to 10
10. Interest paid	16	15	14	15	14	13 to 15
11. Real capital gain to debt	4	7	5	6	7	6 to 8
12. Total return to equity (9-10+11)	-29	33	49	32	17	0 to 2
13. Real capital gain to assets and debt (8+11)	-42	10	27	5	-10	-21 to -25
14. Residual income to equity (12-13)	13	22	22	27	27	22 to 26
Balance sheet: 3/						
15. Assets	690	719	764	794	818	825 to 835
16. Debt	154	142	138	136	134	131 to 137
17. Equity (15-16)	536	577	626	658	684	695 to 705
Percent						
Rates of return and interest rates:						
18. Rate of return on assets (ROA) (7/15)	4.1	5.2	4.9	5.3	5.0	4 to 5
19. Real capital gain on assets (8/15)	-6.5	.5	3.0	-.1	-2.1	-3 to -4
20. Total real return on assets (18+19)	-2.4	5.7	7.9	5.2	3.0	0 to 1
21. Av. interest rate paid on debt (10/16)	10.0	9.9	10.3	10.6	10.1	9 to 11
22. Real capital gains on debt (11/16)	2.5	4.8	3.8	4.3	5.0	4 to 6
23. Real cost of debt (21-22)	7.5	5.1	6.4	6.3	5.1	4 to 6
24. Rate of return on equity (ROE) ((7-10)/17)	2.3	4.0	3.7	4.2	4.0	3 to 4
25. Real capital gain on equity ((8+11)/17)	-7.7	1.9	4.5	.8	-1.5	-3 to -4
26. Total real return on equity (24+25)	-5.4	5.8	8.2	5.0	2.5	0 to 1
27. Net return on assets (NROA) (18-21)	-5.9	-4.7	-5.3	-5.3	-5.0	-5 to -6
28. Spread (20-23) 4/	-9.9	.6	1.4	-1.1	-2.2	-4 to -5

F = forecast. Numbers may not add due to rounding. 1/ Excludes operator dwellings. 2/ Numbers in parentheses indicate components required to calculate ■ given item. 3/ Excludes operator households and CCC activity. 4/ When total real rate of return on assets exceeds total real cost of debt, debt financing is profitable.

Appendix table 2--Farm income and cash flow statement, 1986-91

Item	1986	1987	1988	1989	1990F	1991F
Billion dollars						
Farm income sources:						
1. Cash receipts	135.2	141.7	150.2	159.2	168	170 to 175
Crops 1/	63.7	65.6	71.4	75.4	77	78 to 82
Livestock	71.5	76.0	78.8	83.7	91	89 to 93
2. Direct Government payments	11.8	16.7	14.5	10.9	9	8 to 9
Cash Government payments	8.1	6.6	7.1	9.1	9	7 to 8
Value of PIK commodities	3.7	10.1	7.4	1.7	1	0 to 1
3. Farm-related income 2/	5.0	5.9	5.7	7.4	6	6 to 7
4. Gross cash income (1+2+3) 3/	152.0	164.3	170.4	177.5	184	185 to 190
5. Nonmoney income 4/	6.9	7.5	7.5	7.3	8	7 to 8
6. Realized gross income (4+5)	158.9	171.8	177.9	184.8	191	192 to 197
7. Value of inventory change	-2.4	-2.8	-4.1	4.4	3	1 to 4
8. Total gross income (6+7)	156.5	169.0	173.8	189.2	193	195 to 200
Production expenses:						
9. Cash expenses 5/ 6/	105.2	108.2	112.3	122.8	125	127 to 133
10. Total expenses	125.5	127.7	132.1	142.6	145	149 to 154
Income statement:						
11. Net cash income 1/ 6/						
Nominal (4-9)	46.7	56.1	58.1	54.6	59	55 to 60
Deflated (1982\$) 7/	41.1	47.8	47.9	43.3	45	39 to 43
12. Net farm income 1/						
Nominal total net (8-10)	31.0	41.3	41.8	46.7	49	44 to 49
Deflated (1982\$) 7/	27.3	35.2	34.4	36.9	37	31 to 35

F = forecast. Totals may not add due to rounding. 1/ Includes net CCC loans. 2/ Income from custom work, machine hire, farm recreational activities, forest product sales, and miscellaneous sources. 3/ Numbers in parentheses indicate components required to calculate a given item. 4/ Value of home consumption of farm products and imputed rental value of farm dwellings. 5/ Excludes depreciation and hired labor perquisites. 6/ Excludes farm households. 7/ Deflated by the GNP implicit price deflator.

Appendix table 3--Relationship of net cash to net farm income, 1986-91

Item	1986	1987	1988	1989	1990F	1991F
Billion dollars						
Gross cash income	152.0	164.3	170.4	177.5	184	185 to 190
Minus: Cash expenses	105.2	108.2	112.3	122.8	125	127 to 133
Equals: Net cash income	46.7	56.1	58.1	54.6	59	55 to 60
Plus: Nonmoney income:						
Gross rental value of dwelling	6.0	6.6	6.7	6.6	7	6 to 8
Value of home consumption	.9	.8	.8	.7	1	0 to 1
Value of inventory change	-2.4	-2.8	-4.1	4.4	3	1 to 4
Minus: Noncash expenses:						
Depreciation & accidental damage	17.7	16.5	16.7	17.3	18	18 to 20
Labor perquisites	.4	.5	.5	.4	1	0 to 1
Minus: Household expenses 1/	2.1	2.5	2.6	2.0	2	1 to 3
Equals: Net farm income	31.0	41.3	41.8	46.7	49	44 to 49

F = forecast. Totals do not add due to rounding. 1/ Includes expenses related to operator dwelling.

Appendix table 4--Cash receipts, 1986-91

Item	1986	1987	1988	1989	1990F	1991F
Billion dollars						
Crop receipts: 1/						
Food grains	5.7	5.8	7.5	8.1	8	6 to 8
Wheat	5.0	5.0	6.4	7.2	7	5 to 7
Rice	.7	.7	1.1	.9	1	0 to 1
Feed grains and hay	16.9	14.5	14.3	16.7	19	19 to 22
Corn	12.3	9.9	9.0	11.1	14	13 to 16
Sorghum, barley, and oats	2.3	2.1	2.2	2.1	2	2 to 3
Hay (all)	2.2	2.5	3.0	3.5	4	3 to 5
Oil crops	10.6	11.3	13.5	12.2	12	11 to 14
Soybeans	9.2	10.0	12.2	10.8	11	10 to 12
Peanuts	1.1	1.0	1.1	1.1	1	1 to 2
Cotton lint and seed	3.4	4.2	4.5	4.7	5	5 to 6
Tobacco	1.9	1.8	2.0	2.4	3	2 to 3
Fruits and nuts	7.2	8.1	9.1	9.0	9	8 to 10
Vegetables	8.8	9.9	9.8	11.3	10	10 to 13
Greenhouse & nursery	5.9	6.7	7.0	7.3	8	7 to 8
Other crops 1/	3.3	3.3	3.7	3.7	4	3 to 5
TOTAL CROPS	63.7	65.6	71.4	75.4	77	78 to 82
Livestock receipts:						
Red meats	39.1	44.5	45.9	46.6	51	50 to 54
Cattle and calves	28.9	33.6	36.2	36.7	39	38 to 42
Hogs	9.7	10.3	9.2	9.4	12	11 to 13
Sheep and lambs	.5	.6	.5	.5	1	0 to 1
Poultry and eggs	12.7	11.5	12.9	15.3	16	16 to 20
Broilers	6.8	6.2	7.4	8.8	9	9 to 12
Turkeys	1.9	1.7	2.0	2.2	2	3 to 4
Eggs	3.5	3.2	3.1	3.9	4	4 to 5
Other poultry	.4	.4	.4	.4	*	0 to 1
All dairy products	17.7	17.7	17.6	19.4	21	17 to 21
Other livestock	2.0	2.3	2.4	2.4	2	2 to 3
TOTAL LIVESTOCK	71.5	76.0	78.8	83.7	91	89 to 93
TOTAL RECEIPTS	135.2	141.7	150.2	159.2	168	170 to 175
Program 2/	53.9	52.8	56.3	59.7	65	61 to 66
Non-program 3/	81.3	88.8	93.9	99.5	103	106 to 111

F = forecast. \* = less than \$500 million. Totals may not add due to rounding. 1/ Includes sugar, seed, and other misc. crops. 2/ Receipts from commodities directly supported by farm programs. 3/ Commodities not receiving direct support.

Appendix table 5--Farm income distribution by enterprise type, 1988-90 1/

Item	Crops					Livestock		
	Total crops	Cash grain 2/	Tobacco	Cotton	Fruit, nut, vegetables	Total livestock	Red meat	Dairy
Thousands								
Number of farms:								
1988	812	408	105	24	88	1,385	1,113	194
1989	803	403	104	24	87	1,368	1,099	191
1990F	795	399	103	24	86	1,355	1,089	190
Income:								
1. Cash receipts--								
Crops								
1988	64.7	28.9	2.1	4.2	16.5	6.7	5.2	1.0
1989	68.5	30.3	2.4	4.4	17.7	6.9	5.4	1.1
1990F	73	34	3	5	17	7	6	1
Livestock								
1988	4.0	2.9	.1	.1	.1	74.9	40.2	19.2
1989	4.0	3.0	.1	.1	.1	79.7	40.9	20.9
1990F	4	3	*	*	*	85	44	22
2. Direct Government payments--								
1988	9.5	7.5	.1	.9	.1	5.0	3.7	1.1
1989	7.1	5.6	.1	.7	.1	3.8	2.8	1.0
1990F	6	5	*	1	*	3	2	1
3. Gross cash income-- 3/								
1988	80.4	40.7	2.4	5.3	16.8	90.0	51.1	21.7
1989	82.6	40.7	2.7	5.3	18.0	94.9	51.6	23.4
1990F	86	43	3	6	18	100	54	25
4. Cash expenses--								
1988	48.5	28.1	1.9	2.6	4.8	63.5	41.2	16.5
1989	53.7	31.3	2.1	3.0	5.3	69.1	44.6	18.2
1990F	55	32	2	3	5	70	45	18
5. Net cash income--								
Current dollars 4/								
1988	31.9	12.6	.4	2.8	12.0	26.5	9.9	5.2
1989	28.9	9.4	.6	2.4	12.6	25.8	7.0	5.2
1990F	31	11	1	3	12	30	9	6
Deflated (\$ 1982)								
1988	26.3	10.4	.4	2.3	9.9	21.9	8.2	4.3
1989	22.9	7.4	.5	1.9	10.0	20.4	5.5	4.1
1990F	24	8	1	2	9	22	7	5
Balance Sheet: 5/								
6. Farm assets--								
Real estate								
1988	216.1	100.0	12.0	7.6	41.0	339.3	259.8	55.5
1989	224.7	104.0	12.5	7.9	42.6	352.9	270.1	57.7
1990F	232	107	13	8	44	364	279	60
Nonreal estate								
1988	77.9	45.2	3.8	4.5	7.6	127.1	84.6	30.9
1989	81.2	47.1	3.9	4.6	8.0	132.5	88.2	32.2
1990F	83	48	4	5	8	136	90	33
7. Total liabilities--								
1988	60.1	35.9	1.6	3.1	6.0	71.3	45.1	21.5
1989	59.0	35.3	1.6	3.0	5.9	69.9	44.2	21.1
1990F	59	35	2	3	6	69	44	21
8. Debt-to-asset ratio--								
					Percent			
1988	20	25	10	26	12	15	13	25
1989	19	23	10	24	12	14	12	23
1990F	19	22	9	23	11	14	12	23

Note: This table has not been updated from when published in August 1990.  
 F = forecast. \* = less than \$500 million. Numbers may not add due to rounding. 1/ Farm types are defined as those with 50 percent or more of all sales accounted for by a specific commodity or commodity group. 2/ Includes farms earning at least half their receipts from sales of wheat, corn, soybeans, rice, sorghum, barley, oats, or mix of cash grains. 3/ Equals 1 + 2 + farm related income. 4/ Equals 3 - 4. 5/ Excludes farm households.

Appendix table 6--Farm production expenses, 1986-91

Item	1986	1987	1988	1989	1990F	1991F
Billion dollars						
Farm-origin inputs	30.8	33.1	36.7	39.4	40	38 to 42
Feed	17.9	18.0	20.6	22.7	22	21 to 24
Livestock	9.8	11.8	12.8	13.0	13	13 to 15
Seed	3.2	3.3	3.3	3.7	4	3 to 5
Manufactured inputs	18.2	18.1	18.4	20.7	21	22 to 24
Fertilizer	6.8	6.5	6.8	7.6	7	6 to 9
Fuels and oils	5.3	5.0	4.9	5.3	6	5 to 8
Electricity	1.8	2.2	2.2	2.1	2	2 to 3
Pesticides	4.3	4.5	4.4	5.7	6	5 to 7
Total interest charges	17.1	15.5	15.2	15.1	14	14 to 15
Short-term interest	7.9	7.3	7.3	7.5	7	7 to 8
Real estate interest	9.1	8.2	7.9	7.6	7	6 to 8
Other operating expenses	30.3	32.6	33.0	36.5	38	38 to 42
Repair & maintenance	6.5	6.8	6.9	7.8	8	8 to 10
Labor expenses	9.9	10.8	11.2	11.9	12	12 to 14
Machine hire & custom work	2.1	2.1	2.3	2.7	3	2 to 4
Animal health	1.2	1.3	1.3	1.5	2	1 to 2
Marketing, storage & transportation	3.7	4.0	3.3	4.2	5	4 to 6
Misc. operating expenses	6.9	7.6	8.1	8.3	9	8 to 10
Other overhead expenses	29.2	28.5	28.8	30.8	32	31 to 35
Capital consumption	17.7	16.5	16.7	17.3	18	18 to 20
Taxes	4.5	5.0	5.1	5.3	5	5 to 6
Net rent to nonoperating landlords	7.0	7.0	7.0	8.2	8	8 to 10
TOTAL PRODUCTION EXPENSES	125.5	127.7	132.1	142.6	145	149 to 154
Cash expenses 1/	105.2	108.2	112.3	122.8	125	127 to 133

F = forecast. 1/ Cash expenses equal total expenses minus depreciation, operator dwelling expenses, and noncash labor benefits.

Appendix table 7a--Balance sheet of the farming sector, excluding operator households, December 31, 1986-91

Item	1986	1987	1988	1989	1990F	1991F
Billion dollars						
Farm assets	690.1	719.1	763.5	793.9	818	825 to 835
Real estate 1/	507.3	525.4	555.4	577.6	595	600 to 610
Livestock and poultry	47.8	58.0	65.5	69.7	74	74 to 78
Machinery and motor vehicles	81.9	79.4	80.6	83.8	86	85 to 89
Crops stored 2/	16.7	18.0	23.0	23.5	23	21 to 25
Purchased inputs	2.0	3.3	3.4	2.8	3	2 to 4
Financial assets 3/	34.5	35.1	35.4	36.6	37	36 to 40
Farm debt	154.2	142.0	137.6	135.6	134	131 to 137
Real estate 4/	87.7	79.9	75.8	73.8	72	70 to 74
Nonreal estate	66.6	62.0	61.7	61.8	62	60 to 64
Total farm equity	535.9	582.9	625.9	658.3	684	695 to 705
Percent						
Selected ratios:						
Debt-to-asset	22.4	19.7	18.0	17.1	16	16 to 17
Debt-to-equity	28.8	24.6	22.0	20.6	20	19 to 20
Debt-to-net cash income	330.0	253.0	236.7	248.0	227	230 to 240

F = forecast. 1/ Excludes value of operator dwellings. 2/ Non-CCC crops held on farm plus value above loan rate for crops held under CCC. 3/ Excludes time deposits and savings bonds. 4/ Includes CCC storage and drying facility loans.

Appendix table 7b--Balance sheet of the farming sector, including operator households, December 31, 1986-91

Item	1986	1987	1988	1989	1990F	1991F
Billion dollars						
Farm assets	841.0	886.8	938.5	972.2	885	1,020 to 1,030
Real estate	606.0	633.5	665.8	688.1	650	720 to 730
Livestock and poultry	47.8	58.0	65.5	69.7	46	74 to 78
Machinery and motor vehicles	86.1	84.5	85.7	88.2	88	90 to 94
Crops stored 1/	16.7	18.0	23.0	24.0	23	21 to 25
Purchased inputs	2.0	3.3	3.4	2.8	3	2 to 4
Household goods	28.7	32.9	37.0	41.0	28	45 to 49
Financial assets	53.8	56.7	58.1	58.7	49	57 to 61
Farm debt	166.6	153.7	148.5	146.0	188	140 to 146
Real estate 2/	95.9	87.7	83.0	80.5	106	77 to 81
Nonreal estate	70.8	66.0	65.6	65.5	82	62 to 66
Total farm equity	674.4	733.1	790.0	826.3	697	880 to 890
Percent						
Selected ratios:						
Debt-to-asset	19.8	17.3	15.8	15.0	14	13 to 14
Debt-to-equity	24.7	21.0	18.8	17.7	17	16 to 17
Debt-to-net cash income	356.3	273.9	255.5	267.0	245	245 to 255

F = forecast. 1/ Non-CCC crops held on farm plus value above loan rate for crops held under CCC. 2/ Includes CCC storage and drying facility loans.

Appendix table 8--Farm financial ratios: liquidity, solvency, profitability, and financial efficiency, 1986-91

Farm financial ratios	1986	1987	1988	1989	1990F	1991F
<b>Liquidity ratios:</b>						
Household debt service coverage 1/	4.68	5.65	5.95	5.80	6.2	6.0 to 6.2
Farm business debt service coverage 2/	2.57	3.23	3.42	3.24	3.6	3.3 to 3.5
Debt servicing 3/	.16	.13	.12	.12	.1	.1 to .2
Times interest earned ratio 4/	3.11	3.99	4.11	4.44	4.7	4.3 to 4.5
<b>Solvency ratios:</b>						
Debt/asset 5/	22.4	19.7	18.0	17.1	16.4	16 to 17
Debt/equity 6/	28.8	24.6	22.0	20.6	19.6	19 to 20
<b>Profitability ratios:</b>						
Return on equity 7/	2.3	4.0	3.7	4.2	4.0	3 to 4
Return on assets 8/	4.1	5.2	4.9	5.3	5.0	4 to 5
Net farm to gross cash farm income 9/	20.7	25.1	24.7	26.3	26.6	24 to 25
<b>Financial efficiency ratios:</b>						
Gross ratio 10/	69.2	65.8	65.9	69.2	60.8	62 to 63
Interest to gross cash farm income 11/	10.8	8.9	8.4	8.2	7.4	7 to 8
Asset turnover 12/	21.4	23.3	23.0	22.8	22.8	22 to 23
Net cash farm income to debt ratio 13/	38.5	47.8	51.8	50.7	53.8	52 to 53
<b>Financial leverage index 14/</b>						
	.57	.76	.75	.79	.8	.7 to .8

F = forecast. 1/ Assesses the ability of farm sector households to repay both principal and interest. 2/ Assesses the ability of farm businesses to repay both principal and interest. 3/ Indicates the proportion of gross cash farm income needed to service debt. 4/ Shows the farm sector's ability to service debt out of net income. 5/ Shows the proportion of all assets that are financed with debt. 6/ Measures the relative proportion of funds provided by creditors (debt) and owners (equity). 7/ Measures the ability of farm sector management to realize an adequate return on the capital invested by the owner(s). 8/ Measures how efficiently managers use farm assets. 9/ The profit margin indicates profits earned per dollar of gross income. 10/ Gives the portion of gross cash farm income absorbed by production expenses (claims on farm businesses). 11/ Gives the proportion of gross cash farm income committed to interest payments. 12/ Measures the gross farm income generated per dollar of farm business assets. 13/ Indicates the burden placed on net cash farm income to retire outstanding debt. 14/ Indicates whether or not the use of financial leverage is beneficial.

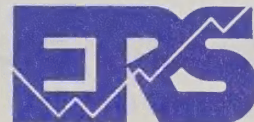
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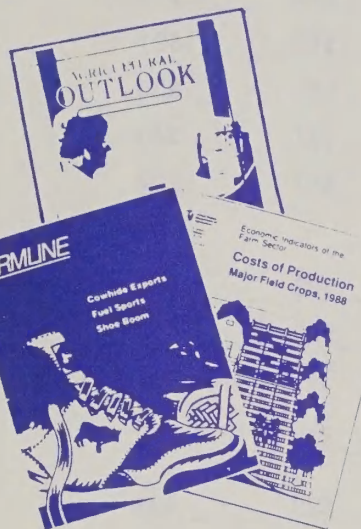
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